

*Regional Cooperation for
Limited Area Modeling in Central Europe*



RC LACE 2020 overview

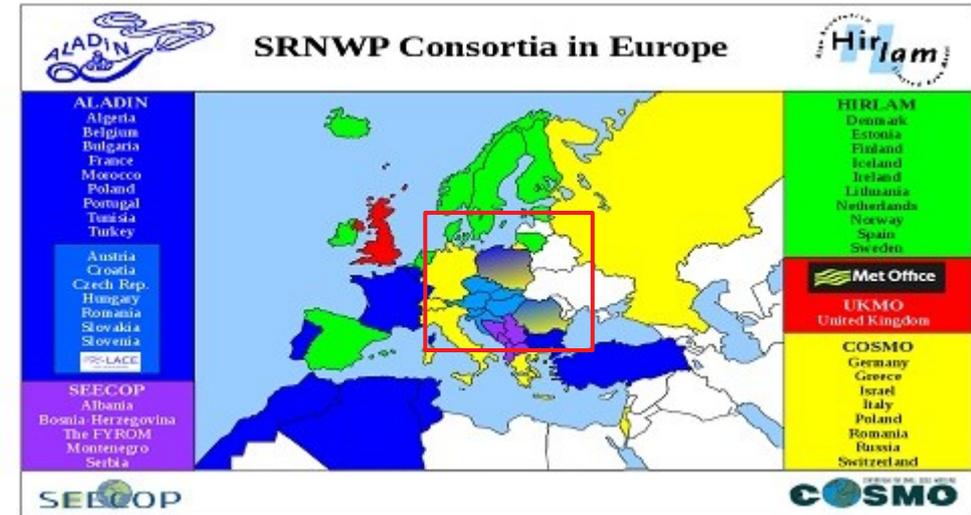
Martina Tudor on behalf of RC LACE MG and many researchers



ARSO METEO
Slovenia

Who? What?

- ▶ New member: **Poland**
- ▶ NMSs of Austria, Croatia, Czech Republic, Hungary, Poland, Romania, Slovakia and Slovenia



- ▶ **Common operational applications**

- ▶ LAEF – Limited Area Ensemble Forecasting system
- ▶ OPLACE – observation pre-processing for LACE
- ▶ Common research activities
- ▶ <http://www.rclace.eu/>

Organisational changes

- ▶ Project Manager: Martina Tudor
- ▶ Area Leaders:
 - ▶ Data assimilation (upper air and surface): Benedikt Strajnar
 - ▶ Dynamics and coupling: Petra Smolíková 
 - ▶ Physics (and surface parametrizations): Bogdan Bochenek 
 - ▶ Predictability: Martin Belluš 
- ▶ Data Manager: Alena Trojáková
- ▶ ALADIN-LACE System Coordinator: Oldřich Španiel



Operational



Forum

- ▶ **Action/Subject/Deliverable: Phasing of common cy48 cycle**
- ▶ **Description and objectives:**

- ▶ new cycle based on merging ECMWF IFS cy47r1 and ARPEGE/LAM code cy47t1
- ▶ The level of automatic/manual merge is significantly decreasing cycles by cycles

cycle 48: 1152 automatic + 64 manual
cycle 47: 1543 automatic + 143 manual
cycle 46: 1932 automatic + 130 manual
cycle 44: 2502 automatic + 215 manual
cycle 42: 2600 automatic + 385 manual

- ▶ Definition of reference version - version cy47_main_v01
- ▶ hendrix:~martinezs/pub/src/arp/cy47/cy47t1_main.01.src.tgz
- ▶ gmckpack (beaufix) : % gmckpack -r 47t1 -b main [-v 01] -u mybranch -l IMPIFC1801 -o 2y etc...

ALARO 1 – issue with not bit reproducibile result between cy47t1_v03 and cy46t1_v04 -> bug in aplmphys.F90

- cy48_main_v01
- cy48_main_v02 – ready for belenos
- BEAUFIX and PROLIX should normally be terminated at the end of the year
- BELENOS – first new Bull cluster, AMD
- Actually there is some issue to connect beaufix/belenos by telnet via parme.meteo.fr

- ▶ **Action/Subject/Deliverable:** Technical preparation and validation of the export version cycle **cy43t2_bf11/cy46t1** and support during implementation on others platforms/compilers.

- ▶ **Description and objectives:**

cy43t2_bf11

- ▶ Finally more than 50 routines , 19 contributors
- ▶ MF/LACE/Hirlam
- ▶ Git : `% git_branch -r 43t2 -b bf [-v 11] -u mybranch`
- ▶ `hendrix:~martinezs/pub/src/arp/cy43/cy43t2_bf.11.src.tgz`

cy46t1

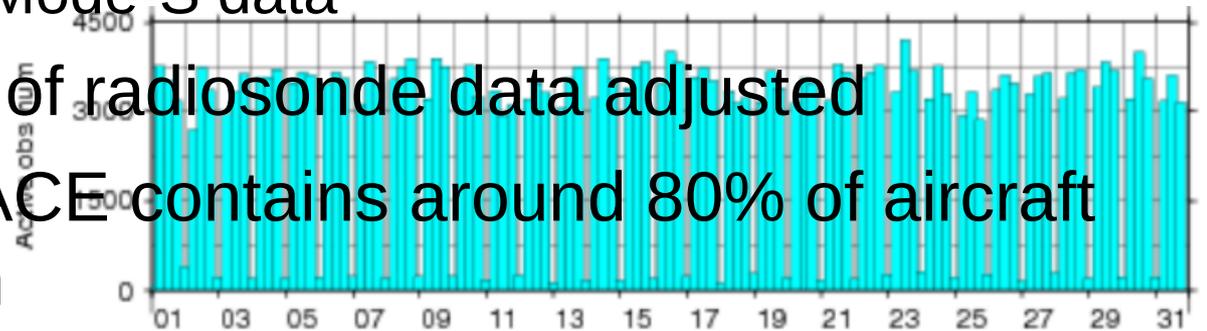
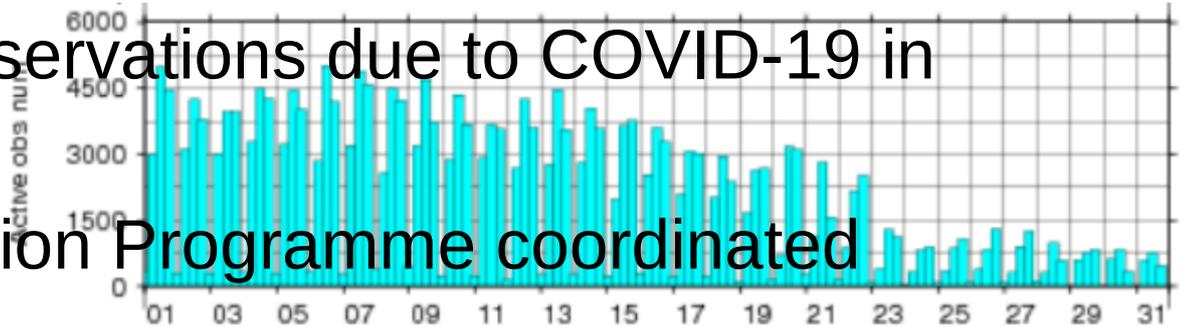
- ▶ Some issue with not bit reproducible result for ALARO 1 with gcc compiler.

- ▶ **Action/Subject/Deliverable:** **Single precision code**

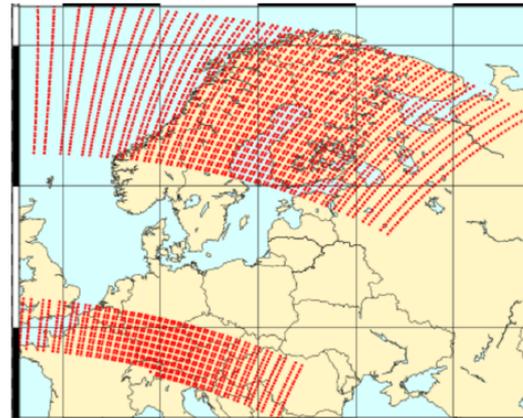
- ▶ **Description and objectives:**

- ▶ implementation of the single precision to ALARO physics
- ▶ **cy46t1** - issue with reproducibility of the ALARO 1 code with gcc compiler
- ▶ delay of delivering new SHMI HPC

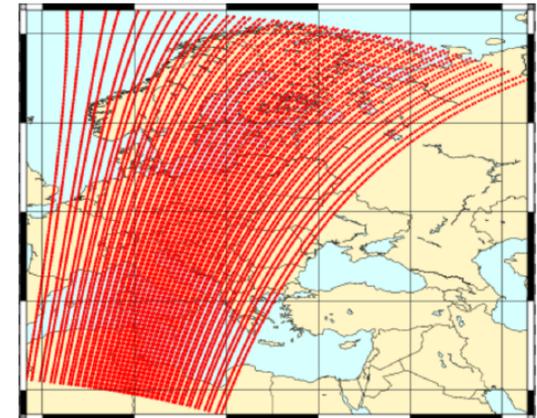
- ▶ decrease of aircraft observations due to COVID-19 in March 2020
- ▶ EUMETNET Observation Programme coordinated mitigating actions:
 - ▶ to increase radiosonde launch schedule
 - ▶ to enhance access to Mode-S data
- ▶ OPLACE processing of radiosonde data adjusted
- ▶ in August 2020 OPLACE contains around 80% of aircraft data from early March



- ▶ new BUFR encoding for EUMETSAT's wind products
 - ▶ data sample tested & only param.cfg requires update for cy43t2
 - ▶ EUMETSAT will implement the new AMV template in Oct 2020!
- ▶ new IASI selection method implemented in Jun 2020



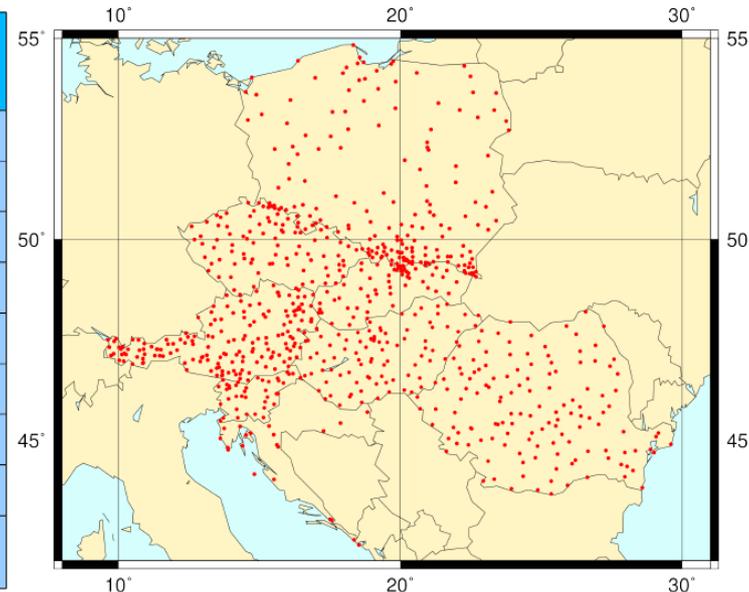
old method



new method

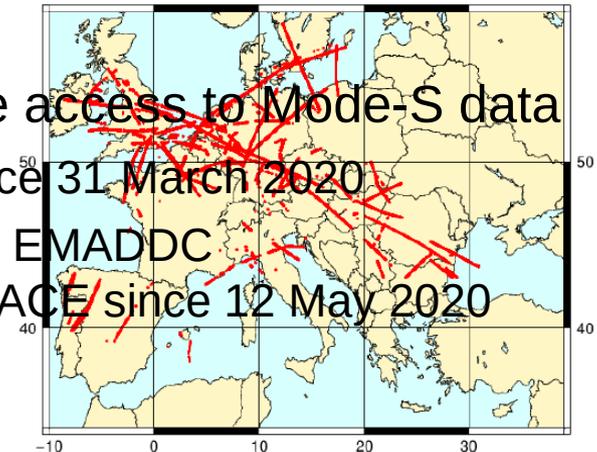
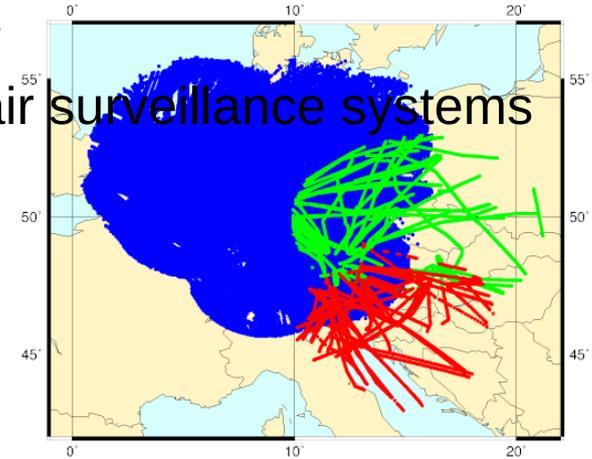
- ▶ internal data exchange within RC LACE
- ▶ high resolution surface synoptic data exchange

Number of national stations		Update WRT 2019
Austria	171	-2/+2
Croatia	23	-0/+1
Czech Republic	89	-0/+0
Hungary	93	-7/+10
Romania	134	-0/+0
Slovakia	49	-0/+2
Slovenia	14	-3/+0
Poland	180	-2/+0
Total:	753	

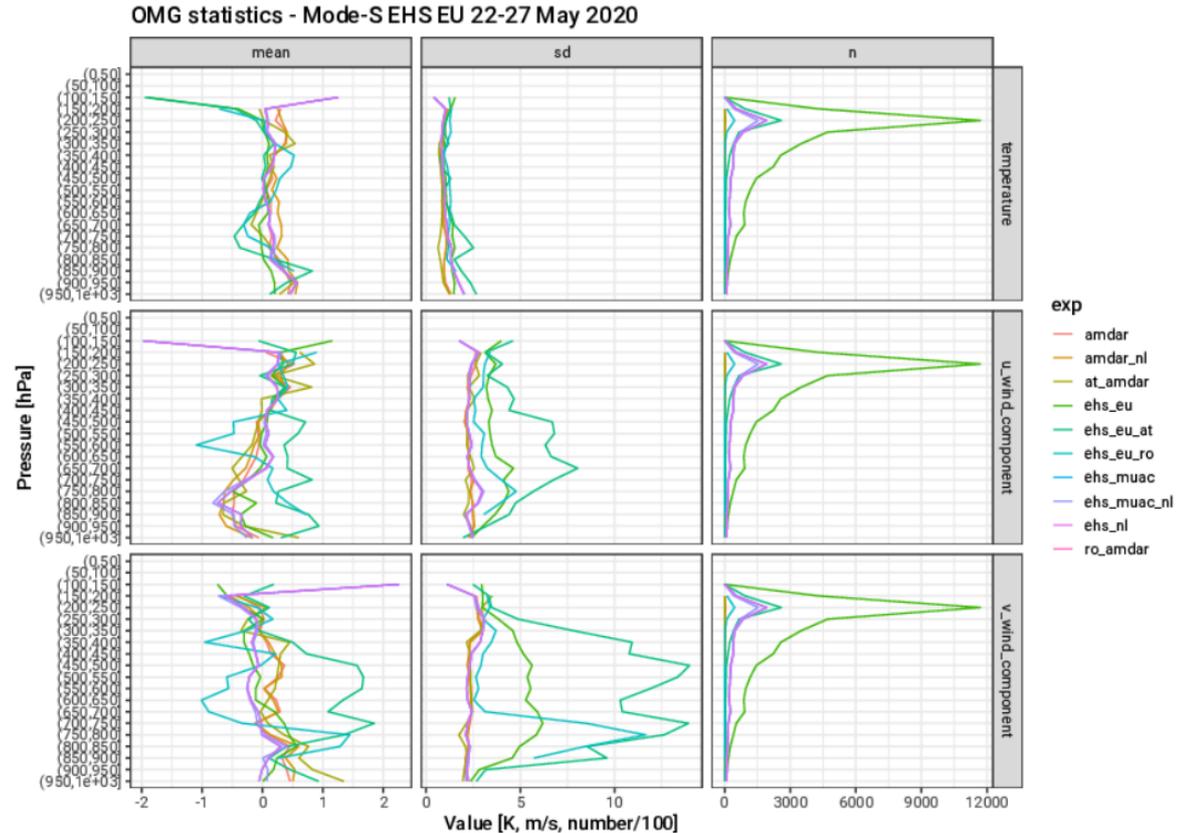


Data Manager activities

- ▶ high resolution aircraft data exchange from modern air surveillance systems
 - ▶ Mode-S EHS from KNMI/Netherlands
 - ▶ Mode-S MRAR from ARSO/Slovenia
 - ▶ Mode-S MRAR from CHMI/Czech Rep
- ▶ decrease of observations due to COVID-19
- ▶ new operational processing system for
 - ▶ Mode-S data (EMADDC) developed by KNMI
- ▶ EUMETNET coordinated mitigating actions to enhance access to Mode-S data
 - ▶ Mode-S EHS from DMI/Denmark available via OPLACE since 31 March 2020
 - ▶ Mode-S EHS from all European countries collaborating with EMADDC (AT,DK,FR,BE,DE,NL,NO,RO,SE,SP,UK) available via OPLACE since 12 May 2020



- ▶ EMADDC made a good progress in improving quality of data processing
 - ▶ to reduce outliers & improve BIAS,STD the whitelisting added since 8 Jun 2020
 - ▶ Higher STD for Mode S data above Austria and Romania



- ▶ Operational upgrades (new cycles, hourly systems)
- ▶ Covid19 impact on operational data assimilation
- ▶ Background error statistics
- ▶ Extended Kalman filter in surface assimilation
- ▶ New data for surface DA
- ▶ Sensitivity of surface OI to structure functions
- ▶ Implementation of RADAR reflectivity and radial wind
 - ▶ Check the dedicated presentation

Ensemble prediction

	A-LAEF	C-LAEF	AROME-EPS
CMC	ALARO	AROME	AROME
Code version	cy40	cy40	cy40
Horizontal resolution	4.8 km	2.5 km	2.5 km
Vertical levels	60	90	60
Runs per day	2	4	1
Forecast length	+72h (00/12 UTC)	+60h (00 UTC), +48h (12 UTC), +6h (06/18 UTC)	+48h (00 UTC)
Members	16+1	16+1	10+1
Assimilation cycle	yes (12h)	yes (6h)	-
IC perturbation	ESDA [surface], spectral blending by DFI [upper-air]	ESDA [surface], EDA, Ensemble-JK [upper-air]	downscaling (AROME-EDA is being tested)
Model perturbation	ALARO-1 multi-physics + surface stochastic physics (SPPT)	hybrid stochastic scheme with a combination of parameter and tendency perturbations	-
LBC perturbation	ECMWF ENS (c903@cy46)	ECMWF ENS (c901+e927)	ECMWF ENS (c901+e927)

- ▶ Developments in TOUCANS mixing length formulation
- ▶ ALARO1 with SURFEX
- ▶ New topography
- ▶ Work on AROME microphysics
- ▶ Issues with research stays
- ▶ Check the dedicated presentation

- ▶ Design of VFE for NH model
- ▶ Dynamic definition of the iterative time schemes
- ▶ Terms redistribution through new vertical motion variables
- ▶ Experiments in very high resolution
- ▶ Reformulation of the NH system as departure from HPE
- ▶ The reports are available on the RC LACE web page

Not only Covid19

- ▶ 4:25 UTC 22nd March 2020
- ▶ 5.5 M earthquake
- ▶ Epicentre Zagreb Croatia
- ▶ DHMZ uninhabitable
- ▶ HPC and servers inside
- ▶ Operations in parallel
 - ▶ ECMWF hpc and cloud
- ▶ Thank you all for help!



Thank you

- ▶ Petra Smolíková, Neva Pristov, Martin Belluš, Antonín Bučánek, Alena Trojáková, Oldřich Španiel, Radmila Brožkova, Jure Cedilnik, Jozef Vivoda, Mihaly Szucs, Christoph Wittmann, Jan Mašek, Mario Hrastinski, Bogdan Bochanek, David Lancz, Simona Tasku, Benedikt Štrajnar, Patrik Benaček, Viktoria Hommonai, Florian Meier, Mirela Pietrisi, Maria Derkova, Antonio Stanešić, Stefan Schneider, J. Vural, Helga Toth, Viktor Tarjani, Peter Smerkol, Mate Mester, Michal Nestiak, Martin Imrišek, Katarina Catlosova, P. Scheffknecht, Martin Dian, Balasz Szintai, J. Kemetmuller, Piotr Sekula, Matjaž Ličar, Iris Odak Plenković, Florian Weidle, Reka Suga, Clemens Wastl, Endi Keresturi, Stjepan Ivatek-Šahdan, Mathieu Dutour Sikirić, Mate Mile and Yong Wang.

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Thank you for your attention.



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